CLAIM OR CLAIMS

I/WE CLAIM:

1. A method for testing agents for effect on human cardiac cells comprising the steps of
culturing cardiomyocytes derived from human embryonic stem cells;
measuring the transmembrane action potential of at least one cardiomyocyte;
exposing the cardiomyocyte to the agent; and
observing whether the action potential of the cardiomyocyte changes after the exposure.

2. The method of claim 1 wherein the cardiomyocyte is selected from the group consisting of atrial-type, ventricular-type and nodal-type cardiomyocytes.

3. The method of claim 1 wherein the culturing is conducted by permitting the human embryonic stem cells to form embryoid bodies and wherein the measuring includes impaling an embryoid body with an electrode.

4. A method for testing agents for their effect on human cardiac cells comprising the steps of
culturing human embryonic stem cells to form embryoid bodies;
identifying an embryoid body from the culture which physically contracts;
measuring a physical characteristic of the contraction of the embryoid body;
exposing the embryoid body to the agent; and
observing any change in the characteristic of the contraction of the embryoid body.

5. A method as claimed in claim 4 wherein the characteristic of the contraction measured is the physical magnitude of the contraction.

6. A method as claimed in claim 4 wherein the characteristic of the contraction measured is the rate of the contraction.

7. A method for testing agents for their effect on the electrical properties of the HERG channel in human cardiac cells comprising the steps of

culturing cardiomyocytes derived from human embryonic stem cells;

inserting an electrode into at least one cardiomyocyte in culture;

measuring the duration of the transmembrane action potential of the cardiomyocyte;

exposing the cardiomyocyte to the agent; and

observing whether the action potential duration is changed by the agent, as would be the case if the HERG channel is altered.

8. The method of claim 7 wherein the cardiomyocyte is selected from the group consisting of atrial-type, ventricular-type and nodal-type cardiomyocytes.

9. The method of claim 7 wherein the culturing is conducted by permitting the human embryonic stem cells to form embryoid bodies and wherein the measuring includes impaling an embryoid body with an electrode.

10. A method for testing agents for their likelihood of triggering delayed after polarization events in human cardiac cells comprising the steps of

culturing cardiomyocytes derived from human embryonic stem cells;

obtaining a chart of the transmembrane action potential of the cardiomyocyte over time;

exposing the cardiomyocyte to the agent; and

observing whether a delayed after polarization event is triggered by the agent.

11. The method of claim 10 wherein the cardiomyocyte is selected from the group consisting of atrial-type, ventricular-type and nodal-type cardiomyocytes.

12. The method of claim 10 wherein the culturing is conducted by permitting the human embryonic stem cells to form embryoid bodies and wherein the measuring includes impaling an embryoid body with an electrode.

13. A method for testing agents for their likelihood of triggering long QT syndrome in human cardiac cells comprising the steps of

culturing cardiomyocytes derived from human embryonic stem cells;

obtaining a chart of the transmembrane action potential of a plurality of the cardiomyocyte over time;

exposing the cardiomyocyte to the agent; and

observing whether a long QT syndrome is triggered by the agent in any of the cardiomyocytes.

14. The method of claim 13 wherein the cardiomyocyte is selected from the group consisting of atrial-type, ventricular-type and nodal-type cardiomyocytes.

15. The method of claim 13 wherein the culturing is conducted by permitting the human embryonic stem cells to form embryoid bodies and wherein the measuring includes impaling embryoid bodies with an electrode.